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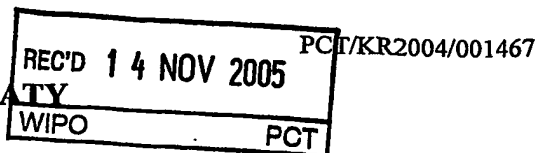
PATENT COOPERATION TREATY


PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference		<b>FOR FURTHER ACTION.</b>		See Form PCT/IPEA/416
International application No. <b>PCT/KR2004/001467</b>		International filing date(day/month/year) <b>18 JUNE 2004 (18.06.2004)</b>		Priority date (day/month/year) 19 JUNE 2003 (19.06.2003)
International Patent Classification (IPC) or national classification and IPC  <b>IPC7 B01J 20/18</b>				
Applicant  <b>SOGANG UNIVERSITY CORPORATION et al</b>				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____ containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand		Date of completion of this report		
<b>19 JANUARY 2005 (19.01.2005)</b>		05 OCTOBER 2005 (05.10.2005)		
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# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/KR2004/001467

## Box No. 1 Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☒ This report is based on translations from the original language into the following language English, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☒ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

- ☒ the international application as originally filed/furnished
- ☐ the description:
- pages \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ the claims:
- pages \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ the drawings:
- pages \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ the sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/KR2004/001467

## Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Claims	1 - 23	YES
	Claims		NO
Inventive step (IS)	Claims	1 - 23	YES
	Claims		NO
Industrial applicability (IA)	Claims	1 - 23	YES
	Claims		NO

### 2. Citations and explanations (Rule 70.7)

The following documents have been considered for the purpose of this report:

D1: WO 01/96106 A

D2: JP 1999-000556 A

The present invention relates to a porous hybrid and a method of preparing the porous hybrid having chemical linkage of zeolite and chitosan comprising the following steps: (a) preparing an intermediate consisting of a first linking compound and zeolite by applying a first linking compound on the surface of zeolite; and (b) preparing a hybrid of chitosan, a linking compound, and zeolite by reacting said intermediate consisting of a first linking compound and zeolite with chitosan or with an intermediate consisting of a second linking compound and chitosan.

D1 which is the most relevant document to the present invention relates to a composite applying zeolite molecular sieve on a substrate by using a linking compound and a method of preparing the same. D1 discloses a method of linking zeolite on a substrate having hydroxyl group or a metal substrate. However D1 does not disclose a method of linking zeolite with chitosan as disclosed in the present invention.

D2 relates to a method of preparing composite particles of chitosan and zeolite having adsorbing characteristics of lead ion complex including a step of manufacturing chitosan particles containing fine zeolite particles by dispersing zeolite particles in an aqueous acidic solution of chitosan and neutralizing the resultant. However D2 does not disclose a method of chemically linking zeolite with chitosan by using a linking compound.

#### I. Novelty and Inventive Step

As disclosed in the Written Opinion of ISR, none of the cited prior art documents including D1 and D2 teaches or suggests the porous hybrid and method of preparing the porous hybrid having chemical linkage of zeolite and chitosan of the present invention. Thus the subject matter of the present invention is novel and is not considered to be easily invented by a person skilled in the art.

#### II. Industrial Applicability

There is no reason for forming a negative opinion about the industrial applicability of this invention. Consequently, claims 1 - 23 appear to meet the requirement of PCT Article 33(4).

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

International application No.

PCT/KR2004/001467

**Box No. VIII Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. In claims 1-4, the expressions "linking compound-zeolite" and "linking compound-chitosan" are inappropriate, since the above linking compounds are called identically though they are different in characteristics. Thus the matter for which protection is sought is not clearly defined.
2. Chemical formulas 4, 5 in claim 19 and chemical formulas 3-5 in claim 20 are not appropriate for representing a linking compound of zeolite with chitosan.